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RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting #3

Additional Material for Appendix I for Sampling Rates Higher than 8 MHz

(Presented by John Van Dongen, FAA Technical Center, ACT-350)

SUMMARY
Contains proposed changes to the published Appendix I of RTCA/DO-260 to facilitate action item 2-12 to add material to describe the technique for developing multisampling matrices for sampling rates higher than 8 MHz..

The following text contains proposed changes to Appendix I to facilitate Action Item 2-12 to add material to Appendix I to describe the technique for developing multisampling matrices for sampling rates higher than 8 MHz.

(Proposed added text is shown in **underlined bold**.)

I.4.2.3 Use of Multiple Amplitude Samples

(3^{rd} Paragraph)

Since there are 8 samples, with 4 possible values each, a Mode S data position can have $4^8 = 65536$ (64K) different sample patterns. Two 1-bit tables, each stored in a 64K x 1 ROM, are defined over the set of patterns: the first declaring the bit position to be a '1' or '0', the second high or low confidence. Once the pattern existing for a given bit is determined, two table lookups supply the proper declaration. **If higher sampling rates are used, the number of sample patterns and the table size will increase exponentially.**

I.4.2.4 The 4-4 Multiple Amplitude Approach

(insert the following paragraph at the end of section I.4.2.4)

If a sampling rate higher than 8 MHz is used, the number of samples from the odd and even samples will increase accordingly, and the table size will increase exponentially. For example, if a 10 MHz sampling rate is used, there are 5 samples in each set, and each sample is quantized to the same 4 levels as above, $4^5 = 1024$ patterns are possible for each set. The total table requirement for data and confidence, for the two sample sets, is thus 1024x6. If a 16 MHz sampling rate is used, there are 8 samples in each set, and each sample is quantized to the same 4 levels as above, $4^8 = 65,536$ (64K) patterns are possible for each set. The total table requirement for data and confidence, for the two sample sets, is thus 64Kx6. Once the values and confidences are determined for each set of samples, odd and even, the composite values are declared according to Table I-1 independent of the sampling rate.